

Down the Cow Path with Gasoline Additives – Part 2: Ethanol

By Lisa Alexander

If the history of 1900s gasoline additives is a cow path, then the history of ethyl alcohol for fuel is a rabbit hole in Wonderland. Ethanol may seem like something new to those who don't know history, but alcohol has been a fuel since the 1800s. The earliest cars ran on ethyl alcohol. Ethanol didn't just "appear" as a possible fuel additive a couple of decades ago because someone decided cars should get "greener." It has a long, somewhat forgotten history, complete with colorful conspiracy theories. In researching ethanol as a fuel or fuel additive, the problem is not *finding* information, but rather, determining what to *omit*.

An alcohol blend known as "camphene" (made from alcohol, turpentine and camphor) was used in the 1800s for a number of applications, including lighting, for 30-40 years before oil was discovered in Pennsylvaniaⁱ. Ethanol was used in the first prototype internal combustion engine by Samuel Morey in the U.S. in 1826. This invention was all but lost in the short-lived enthusiasm for steam engines. It wasn't until three decades later that ethanol was used again in a four stroke engine by Nicholas Otto in Germany and by Henry Ford in the U.S. Ford imagined ethanol would be *the* fuel that would power his cars and advocated for it well into the 1930s.

There were other forces in play in the U.S. regarding ethanol. In the late 1800s, about the time kerosene became widely available, a temporary \$2.08 per gallon tax (about \$44 dollars today) was put on alcohol/ethanol to pay for the Civil Warⁱⁱ. Although the intention was only to tax beverages, it was broadly applied and a 90 million gallon per year agriculture based alcohol distilling industry collapsed almost overnight. The tax made ethanol too expensive to use as fuel. The transition to kerosene for lighting and to gasoline for cars, then considered a "waste product" from the oil refining industry, was almost instantaneous. Gasoline, at that time, was a far cheaper alternative; the tax ensured it was quickly adopted.

Meanwhile, according to some ethanol advocates, almost anyone could have made alcohol in their backyard, from grains, bad apples, potatoes, vegetables or even grasses unfit for consumption, etc., thereby avoiding the taxⁱⁱⁱ. There have been suggestions that John D. Rockefeller (secretly) funded the Temperance movement as scheme to prevent home-distillers brewing their own alcohol "for fuel" through the 1920s, further ensuring that new drivers would have to buy gasoline^{iv}.

Meanwhile, Europe had adopted a gasoline-ethanol blend, adding far higher percentages (30-50%) of ethanol than are in use in the U.S. today. Ethanol was the European octane booster of choice until Tetraethyl Lead proved a better option in World War II.

During the debates over ethanol versus MtBE, some touted MtBE as the better additive, preserving the integrity of gasoline over time and improving mileage. Eventually the impacts to groundwater and drinking water supplies became too numerous and too severe.

Those arguing for ethanol talked about a revival of farming and energy independence. Ethanol was touted as a “green,” “home-grown,” “less polluting” octane-boosting gasoline additive that would help decrease dependence on foreign oil. Ethanol critics pointed to its affinity for water which would spoil the gasoline and potentially cause corrosion. They also questioned whether there was a net energy loss: rather than furthering energy independence, arguing that the production of ethanol required more energy than the final product contained, and its use reduced mileage.

A 10% blend was mandated by the Federal government in 2005, and soon after, corn based ethanol became the subsidized source of most of that ethanol.

To read some of the recent articles, it seems the ethanol love affair is already over^v, at least for farmers if not the big ethanol producers. A recent push to increase the percentage of ethanol in gasoline was defeated by opposition from a number of fronts. It is unclear what the future holds for this “latest and greatest solution to cleaner, greener fuels.”

In the U.S., most ethanol is currently made from corn (the kernels, not the whole plant), but the industrial farming practices are controversial, including the vast corn monocultures, the use of genetically modified crops, conversion of food crops to fuel crops, increased soil erosion, and increased use of herbicides. As farms expand, the loss of buffer strips along the edges and borders of farms has destroyed habitat for bees, birds and butterflies^{vi}. Just this week, the Federal government has chosen to fund efforts to replant some of those edges in hopes of protecting foraging honeybees^{vii}.

Meanwhile, research continues for better, less polluting, safer fuels, whether it's cellulosic alcohol from switchgrass, trees or other grasses. Interestingly, recent research on large grazing animals being allowed to roam freely in forests and grasslands suggests it may have far greater ecological restorative and carbon capturing benefits (and healthier cattle and meat) than trying to grow a marginally cleaner fuel from grains^{viii}. Biodiesel is offered up from time to time, including production methods using algae, but it seems to be a way off. More efficient cars, solar charged electric cars and fuel cells are occasionally touted, but the one thing that is clear, this most recent solution, using ethanol in the quest for a cleaner, greener car fuel, is just another twist in the cow path.

ⁱ <http://www.environmentalhistory.org/billkovarik/research/henry-ford-charles-kettering-and-the-fuel-of-the-future/>
Detailed history of the transition from ethanol to gasoline.

ⁱⁱ Ibid.

ⁱⁱⁱ http://www.journeytoforever.org/ethanol_link.html Note that in the U.S., as in most countries, anyone wishing to make their own ethanol fuel needs to get a "small fuel producer" permit from the US Alcohol and Tobacco Tax and Trade Bureau (TTB). The site explains the details.

^{iv} Kovarik..

^v <http://fuelfix.com/blog/2013/11/12/the-secret-dirty-cost-of-obamas-green-power-push/?cmpid=eefl>

Article discussing some of the environmental downside of corn-based ethanol.

^{vi} <http://archive.audubonmagazine.org/incite/incite0408.html> Article against the costs of ethanol.

^{vii} <http://naturalsociety.com/usda-spend-3-million-save-honey-bees/> News release about trying to restore some of the plants and wildflowers used by bees and butterflies in farm areas.

^{viii} <http://onthecommons.org/can-cattle-save-us-global-warming> interesting new research on the topic.